CIRCULAR No. 1.*

United States Department of Agriculture,

DIVISION OF POMOLOGY.

NUT CULTURE.

By H. M. ENGLE, *Pennsylvania.*

When the extent of territory in the United States capable of growing all kinds of edible nuts is considered, there seems to be no reason for importing hundreds of thousands or maybe millions of dollars' worth annually. It is also strange that while so much money is lying idle and so many unemployed voices are clamoring for work this profitable industry remains undeveloped.

Reliable reports of the value of nuts produced from single trees or from small areas should be sufficient to induce capitalists to invest in nut culture as a paying business; and since agriculture has been less profitable of late than formerly, these reports of success should induce farmers to plant nut-bearing trees, which might in a few years pay better than any other similar area of the farm.

Of course all kinds of nuts will not grow in all kinds of soil, but most soils will produce some kind of nuts.

The food value of nuts should be taken into consideration as well as the pecuniary interest. In this country nuts have hitherto been used principally as a luxury, but the time seems not far distant when some kinds at least will be grown as food, many of which are more palatable and nutritious than some foods in general use.

In importance I would enumerate nuts in the following order, viz: Chestnut, pecan, English walnut, shellbark, black walnut. The native chestnut, shellbark, and black walnut are perfectly hardy, while among the foreign chestnuts, pecans, and English walnuts there are some varieties that are not hardy.

Among chestnuts the native American is not excelled, although it generally lacks size when compared with some of the foreign varieties.

Spanish and other chestnuts have been grown in this country for many years, and the general impression is that all large chestnuts are of inferior quality; but this mistaken impression will, no doubt, be dispelled ere long, since there are several varieties which are nearly if not fully equal in quality to the native nuts; for instance, Paragon, Numbo, Ridgely, and some of the newer seedlings, are said to be greatly improved in quality, probably by the influence of native pollen, which in many instances is carried long distances by insects or winds.

---

* Reprinted from Report of The Pomologist for 1894.

Chestnuts can be grown in a variety of soils, but flourish best on light, rolling, or hilly lands. In fact, they are indigenous to rocky or mountainous regions.

The latest advance in chestnut culture is to cut away chestnut forests and graft improved varieties on the sprouts, keeping down all growths of the original stump except those grafted, which should stand at such distances as not to crowd when the trees shall have grown to their full size. It can scarcely be credited, except by those who have seen, how early and profusely they will bear when thus treated. To the forestry advocates I would say that this method of propagation is not deforesting, but reforesting by advanced ideas. The experience of the writer has thus far been with Paragon, and has been quite satisfactory, the trees grafted on sprouts bearing much younger than was expected. The only drawback thus far has been the chestnut weevil, which does considerable damage some seasons. There are evidently three different weevils which injure the nuts: First, the common larva, which is about three-eighths to one-half inch long, with generally but one in a nut; second, a larva similar to the first, but only about one-fourth as large, with from six to ten in a nut. These both evidently grow in the nut, as we see no mark of their entrance; the eggs must therefore be deposited in the nut when young. The larva of the third resembles closely that of the codling moth, being of a purplish color, and is rarely found in the nut, but seems to operate from the outside, and seldom spoils the nut altogether—in fact, in many cases barely destroys a portion of the shell of the nut. The latter is not so destructive as the former two, and I believe can be destroyed by spraying in the same manner that apples, pears, etc., are treated. I am inclined to believe that it is similar to the apple curculio, which is very destructive in some apple orchards, causing apples to become more gnarled than wormy.

NOTES ON NATIVE AND FOREIGN NUTS.

Pecans have thus far been confined principally to southern latitudes, where also the finest are grown. They are said not to be hardy in northern latitudes, although some are grown as far north as Illinois, where nuts of fine quality are produced. No doubt, by growing seedlings, choice and hardy varieties will be forthcoming, as has been the case with fruits generally.

English walnuts (perhaps not of English origin, nevertheless they generally pass by that name) are pretty generally grown, and considering the excellent hardy ones it seems strange that they are not more extensively grown, since they succeed so well over so large an extent of territory and on so great a variety of soils, although they flourish best in those of a rich nature.

The new and improved Japan varieties should give this branch of nut culture fresh impetus.

The *shellbark*, the kernel of which is scarcely second to that of any nut grown, owing to the difficulty of transplanting and grafting, has not received the attention it would have received could it be more easily propagated. However, the impetus which nut growing has received will no doubt bring it into more prominence.

The *black walnut* has perhaps received the least attention of any nut, that is, for the nut product, but it is no doubt susceptible of the same degree of improvements as are the other varieties of nuts. Wherever its planting has been extended it has been more on account of the wood than of the nuts, although the traffic in black walnuts is by no means insignificant.

Of the nut-bearing trees mentioned in this paper there is none of which the timber is so valuable as that of the walnut. Of late years the old black walnut

trees, from which for half a century or more the nuts have been carefully gathered by boys and stored for winter, have succumbed to the woodman's axe, or rather saw, and much of the lumber has been exported to Europe.

It is time that plantings should be made to replace the wholesale destruction of this beautiful tree yearly taking place.

The *white walnut* (butternut) should not be despised or neglected, although not of as much value as those referred to. It may also be improved in the quality of its fruit by proper selection.

In the still further improvement in nut culture the primary objects should be to obtain size, quality, productiveness, and hardiness, and, in addition, I would emphasize, "*aim at more kernel and less shell.*"

It should not be more difficult to obtain this end than for stockmen to breed out bone and add muscle in swine and cattle, or for dog fanciers to breed tails off from dogs.

We have thus briefly described, under their popular names, the most common and widely distributed varieties of native and other nuts adapted to general culture, and we earnestly hope that experiments with the same may be begun wherever they will flourish. We may, at the same time we are cultivating trees for their fruit, point out in an humble way the means by which profitable and useful trees may be restored to sections from which fire and the ruthless hand of man have thoroughly removed them.

CHESTNUT ORCHARD OF H. M. ENGLE, YORK COUNTY, PENNSYLVANIA.

On Saturday, September 29, 1894, at the request of Mr. Henry M. Engle, the Pomologist visited his chestnut orchard in York County, Pennsylvania.

Mr. Engle had urged the necessity for such a visit, stating that his object was to convince the fruit growers of the United States through the report of the Division of Pomology that we ought to produce all the chestnuts consumed in the United States, and thus save the amount annually expended for foreign chestnuts.

It was found that he had 25 acres grafted; 5 acres grafted one year, 5 acres grafted two years, and the same number of acres per year, his oldest grafting being five years.

The land rises with a very steep grade from the Susquehanna River, is very much broken, rough, and rocky, and has never been plowed.

In some portions the native chestnut trees appear to have grown upon sections entirely covered with stones.

The only evidence of cultivation was the cutting of paths through portions of the orchard by means of the scythe. All other portions of the ground were overgrown with whortleberry, raspberry, blackberry, and other bushes.

Trees grafted one year of course had not yet fruited. Trees grafted two years had as high as 35 burs, averaging three chestnuts per bur. Trees grafted four years had upward of 400 burs, and those grafted five years had upward of 500 burs by actual count.

The pomologist was accompanied on this visit by several gentlemen, who counted and reported to him the crop of quite a number of trees of different ages, and the above is an average of their investigation. Mr. Engle was requested to incorporate the results of our observations in a paper that he had promised to prepare upon nut culture, but since they did not appear therein it is deemed proper that such notes should become part of this paper.

I am satisfied that there are tens of thousands of acres of native chestnut land in many of our States that might be treated in the same manner.

Land unfit for any other form of cultivation might in a few years become very profitable and the ratio of woodland to cleared land remain undisturbed.

NOTE.

GRAFTING THE CHESTNUT UPON THE OAK.

The European sweet chestnut (*Castanea sativa*) has been grafted for many years in France and England upon the European black oak (*Quercus robur*) using young seedlings raised by planting acorns where the trees are to remain permanently or which have been freshly planted, and also upón branches of proper size on matured trees.

We are not aware that this method has been practiced in the United States until quite recently. A distribution of scions of the Paragon, Numbo, and Ridgely was made by the Department of Agriculture, through the Division of Pomology, in the spring of 1895 and also in 1896. The scions were accompanied by a circular descriptive of the methods of grafting these varieties upon stocks of the American chestnut (*Castanea dentata* Marsh.) together with a recipe for a grafting wax suitable to endure both the heat of summer and the cold of winter.

Many parties devoid of experience in grafting reported good success by the plan suggested. From two parties we have reports of grafting one or more of the above named varieties of chestnuts upon the chestnut-oak (*Quercus prinus*):

M. B. Waite, of the Division of Vegetable Physiology and Pathology, Department of Agriculture, reports as good success on the chestnut-oak as a stock as upon the native chestnut.

N. I. Haley, Sandy River, Va., writes, June 26, 1896, "Those in chestnut-oak are doing equally as well as those in chestnut. The growth is now from 18 to 36 inches."

It may be possible to succeed with other species of the oak as stocks. The chestnut-oak belongs to the white oak group (*Leucobalanus*) in which are found the post, burr, swamp post, swamp white oak, basket oak, yellow oak, etc., species more or less intimately allied to each other.

The success attained in Europe by using the European black oak as a stock would indicate that our black oak group (*Melanobalanus*) might possibly be equally available. This group comprises the red, scarlet, pin, Spanish, bear, water, shingle oak, etc., and covers separately and conjointly a vast area of country. Should several of these species be found to be suitable stocks for the chestnut, the cultivation of this valuable nut would be much extended, as oaks will grow in soil and under conditions in which the roots of the native chestnut would die, if planted.

We would urgently request that the recipients of this circular try grafting the chestnut upon any and all the species found indigenous in their neighborhoods and report their success or failure to this Division.

S. B. Heiges,
Pomologist.

August 18, 1896.